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L9: Entry 20 of 20

File: USPT

Jan 20, 2004

DOCUMENT-IDENTIFIER: US 6681176 B2

TITLE: Method and device for a detachable navigation system

Brief Summary Text (7):

GPS receivers for outdoor use may include a display, functional buttons, a microprocessor, a battery, and a GPS receiver. Several models are available on the market. Outdoor GPS receivers may be capable of showing map information.

Brief Summary Text (8):

Therefore, what is needed is a device that provides theft protection via a detachable faceplate and that also provides the functionality of a handheld navigation device useful for non-automotive applications.

Drawing Description Text (4):

FIG. 3 illustrates a handheld navigation device in the prior art.

Drawing Description Text (6):

FIG. 5 illustrates a backside of a handheld navigation device for a vehicle electronic system according to the present invention.

Detailed Description Text (4):

FIG. 3 shows handheld navigation device 30 having display 11 and input controls 12. Handheld navigation device 30 is a GPS receiver including an antenna (not shown), processor (not shown), display 11, and memory (not shown).

Detailed Description Text (7):

Handheld unit 42 may be a navigation unit which may be used as an in-car navigation unit when it is attached to electronic unit body 44 built into the car (not shown). If handheld unit 42 is detached from electronic unit body 44, handheld unit 42 operates as a handheld navigation unit for hiking or pedestrian navigation. For handheld purposes, handheld unit 42 may provide walking directions, for example, either through national parks or within cities (for example, providing to user 45 a route from a parking garage to the building, restaurant, or address).

Detailed Description Text (8):

Handheld unit 42 may include a built-in GPS receiver and a built-in antenna which may provide satellite reception when handheld unit 42 is detached from electronic unit body 44. If attached to electronic unit body 44, an external antenna (not shown) mounted, for example, on the car's roof, may provide satellite reception. This external antenna may connect to handheld unit 42 through electrical contacts (not shown). Alternative methods for navigating may also be included in either handheld unit 42 or electronic unit body 44 instead of or in addition to a GPS receiver. For instance, the invention may use DGPS (Differential GPS), AGPS (Assisted GPS), triangulation, hyperbolic intersection of time-delay solutions, and cell identification to position user 45.

Detailed Description Text (12):

Inertial sensors (not shown) may be included in handheld unit 42. These inertial

sensors may be, for example, accelerometers or angular velocity sensors. These inertial sensors may provide inertial information if the GPS receiver does not get satellite reception (e.g. indoors). Additionally, inertial sensors may be provided in the vehicle and connect to electronic unit body 44 to provide inertial information while the navigation system is used in a driving mode. This additional inertial information may be useful to improve the quality of the navigation information and to provide navigation information in an area of low or no satellite coverage (e.g., in a parking garage or tunnel).

Detailed Description Text (13):

Handheld unit 42 may include a portable AM/FM receiver or an MP3 player for playing music while user 45 is away from the vehicle. The speaker (not shown) may be either a built-in speaker or may be a headphone or ear bud.

Detailed Description Text (14):

Handheld unit 42 may also include cell phone functionality enabling user 45 to make telephonic communications while away from the vehicle. This embodiment may be particularly advantageous by combining the cell phone with the navigation device and thereby reducing the number of electronic accessories user 45 must carry. Additionally, as noted above, a cell identification system or triangulation method using cell phone base stations may be used to position the user, thereby reducing the amount of additional electronics needed in handheld unit 42. The speaker for the cell phone may be either built-in or may be a headphone or ear bud. Similarly, handheld unit 42 may also include an instant messaging or text messaging device (e.g., pager, ICQ client, AOL Instant Messenger client, etc.).

Detailed Description Text (18):

FIG. 5 illustrates a backside of a handheld navigation device for a vehicle electronic system according to the present invention. Handheld unit 42 is held in position within a dashboard receptacle by a combination of elements including hooks 52 on one edge (or alternatively on any other edge) interacting with holes in the dashboard receptacle. Also holding handheld unit 42 in place is releasable locking mechanism 53 which interacts with the locking mechanism in the dashboard receptacle. Releasable locking mechanism 53 is controlled by the release button on the frontside of handheld unit 42. Aligning handheld unit 42 with the dashboard receptacle is the engagement between edges 50 and the sidewalls of the dashboard receptacle. When positioned in the dashboard receptacle, electrical contacts 51 of handheld unit 42 come into contact with electrical contacts in the dashboard receptacle. Electrical contacts 51 carry both power and signals between handheld unit 42 and the electronic unit body. The power carried through electrical contacts 51 may include power for operating the microprocessor, display, or other systems in handheld unit 42, and may also be for recharging batteries of handheld unit 42 for operating handheld unit 42 in a stand-alone capacity. The signals carried through electrical contacts 51 may include navigation signals received in a vehicle antenna communicated to the microprocessor of handheld unit 42 for calculating navigation information. The signals carried through electrical contacts 51 may also include control signals from the input controls on the frontside of handheld unit 42 for the operation of the vehicle electronic unit.

Detailed Description Text (19):

FIG. 6 is a flowchart showing a method according to the present invention. The flow starts in circle 60 and proceeds to diamond 61 for the query whether the use is for driving. If the answer to the query in diamond 61 is negative, then the flow proceeds to diamond 62, which queries whether the use is for walking. If the answer to the query in diamond 62 is negative, then the flow proceeds to end circle 63. If, however, the answer to the query in diamond 61 is affirmative, then the flow proceeds to diamond 64, which queries whether the faceplate is attached. If the answer to the query in diamond 64 is affirmative, then the flow proceeds to box 65 which indicates the action of navigating. This flow represents the situation in which a driver is in the vehicle and the faceplate is attached so the system is

ready to navigate. Therefore, from box 65 in which the user navigates, the flow proceeds to circle 63, which is the end. If the answer to the query in diamond 64 is negative, the flow proceeds to box 66 which indicates that the faceplate is inserted into the receptacle. This flow describes the situation in which, for instance, a driver returns to the vehicle after having used the faceplate as a pedestrian or personal navigation device and is preparing to drive the vehicle and desires to use the navigation device in the vehicle. The driver therefore inserts the navigation device into the dashboard receptacle and is thereafter able to use the navigation device for vehicular navigation. As described above, insertion of the detachable navigation device into the dashboard receptacle connects the handheld navigation device to a vehicle antenna which enables the navigation device to function as a vehicle navigation device. From box 66, the flow proceeds again to box 65 in which the user navigates using the device, and subsequently to end circle 63.

Detailed Description Text (21):

Alternatively, if the answer to the query posed in diamond 68 is in the affirmative, then the flow proceeds to box 70, in which the user downloads a map set for the intended walking region. This flow represents the scenario in which the user desires to use the handheld navigation device in an area remote from the position of the vehicle at the time of detaching the faceplate from the receptacle. One situation in which this scenario arises is when the user is at the airport and is flying to another area and wishes to use the handheld navigation device in that area. Another scenario where the user may desire to select a specific map set for loading into the detachable faceplate navigation device is when the user plans to hike for a long distance, perhaps several days, and therefore needs a map set catered to the specific area in which the user plans to travel, for instance along a specific trail. Since the map set loaded into the handheld navigation device by default may be the area surrounding the vehicle (based on the assumption that generally a user will use the handheld navigation device in the area around the vehicle), it is therefore necessary to direct the device to load a map set for the remote area. This loading of user-directed map data is accomplished in box 70. From there the flow proceeds to box 69, in which the user detaches the faceplate, and from there to box 65, in which the user navigates. From there the flow ends at circle 63.

Detailed Description Text (22):

Alternatively, if the answer to the query posed in diamond 67 is in the negative, then the flow proceeds to diamond 61, in which the query is posed whether the user is walking in an area remote from the vehicle. If the answer to the query posed in diamond 71 is in the negative, then the flow proceeds to box 65, in which the user navigates, and from there to end in circle 63. This situation represents the scenario in which the user has the handheld device in hand, and is planning on navigating around the vehicle. Therefore, by default, a map set of the area around the vehicle has been loaded into the handheld device, and therefore the user is able to navigate without any additional actions. However, if the user had previously selected a remote map set, then an additional step (not shown) of loading the local map set would be required prior to proceeding to box 65 to navigate. If the answer to the query posed in diamond 71 is in the affirmative, then the flow proceeds to diamond 72, in which the user is queried whether there is access to downloadable electronic maps. If the answer to the query posed in diamond 72 is in the negative, then the flow proceeds directly to end circle 63. If the answer to the query posed in diamond 72 is in the affirmative, then the flow proceeds to box 73, in which the user downloads a map set for the intended region. This situation represents the scenario in which the user is traveling away from the vehicle and either changes plans and goes to a different or additional remote location, or fails to download the correct map set for the intended traveling area. In this case, if the user has access to an electronic map set, the user may still be able to use the handheld navigation device in the remote location. Access to an electronic map set may be through a personal computer (e.g. a laptop) with a

docking station or other connection for the handheld navigation device. The handheld unit may be received in a docking station that is part of a personal computer. The docking station may be adapted to receive the handheld unit and may electrically couple the handheld unit and the personal computer when the handheld unit is received in the docking station. Map information may be downloaded from the personal computer to the handheld unit when the handheld unit is received in the docking station. Position information may be uploaded from the handheld unit to the personal computer when the handheld unit is received in the docking station. Alternatively, an electronic map set may be available to the user if the user is acquainted with another person with a compatible faceplate navigation device which is provided with the ability to accommodate additional faceplate devices. A third alternative may be that an electronic dealer may provide the service of providing downloadable maps at a store or dealership. Alternative provisions for downloading electronic maps may also be possible. From box 73, the flow proceeds to box 65, in which the user navigates, and from there to end circle 63.

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